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Letter	QMRDW-I
DATE	12 Oct 54
SECURITY OFFICER	
Frank B Rogers	

Monthly Report - 1 January 1944

During the month four main groups of items have been studied and reports are in preparation.

1. Mittens
2. Sleeping Gear
3. Tents
4. Footgear

A great deal of emphasis was placed upon a study of mitten combinations. This was designed to complement the study of Glove Liner (Report No. 42). Four types of mitten combinations were studied, two experimental items identified as the Wilkins-Ford mitten and the Washburn mitten, and two standard items, the M-1943 trigger-finger mitten and shell and the M-1941 trigger-finger, mitten and shell. Thermal insulation of the mitten was in the order of mention, progressing from the warmest to the coldest combination. Tolerance times at exposure temperatures from plus 20°F., to minus 40°F., were studied. Skin temperature measurements were made at three or more sites on the hands. Approximately half of the experiments were done sitting at rest. The remainder were while walking with a rifle as on sentry duty. The mean tolerance times at rest ranged from 46 minutes at minus 40°F., with the M-1941 combination to more than 180 minutes with the Wilkins-Ford combination at plus 20°F. During light rifle duty the tolerance times were increased by from 10 to 20 percent over those observed while at rest.

Several aspects of the sleeping gear problem were studied. Heat loss from the standard sleeping bag through the under surface and over the top of the bag was studied by means of a thermocouple canvas blanket. All of the studies pointed to one significant fact. The loss of heat through the under surface of a sleeping bag filled with a compressible substance such as down or feathers is considerably greater than that lost through the uncompressed upper portion of the bag. Any design which will increase the thermal insulation of the under surface of sleeping bags will increase the efficiency of the bag materially. The addition of a comforter, blankets or a sleeping bag pad placed inside of the bag between subject and bag will accomplish a great deal. Two types of casualty bags for air transport were studied. The bags were heavy and weighed more than 23 pounds each. They had a clo value of approximately 8.0, similar to that of the Arctic bag, inner and outer case. The tolerance time, however, of the casualty bag was considerably below that

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of the Arctic combination, which weighed slightly more than half as much. If a subject in the casualty bag were wrapped in two or three blankets, the tolerance time could be increased to correspond to that of the Arctic combination.

Thermal insulation and moisture penetration of tents were studied, using the two-man mountain tent made of various fabrics and an experimental double wall four-man tent. On the basis of the studies pursued it was not clearly understood whether a moisture permeable fabric or a moisture impermeable fabric should be selected for cold weather and Arctic tents. The value of a double wall over a single wall when using the four-man mountain tent was clearly established.

The study of footgear was continued. An improved but not perfected shoepac designed on an especially wide last was studied in the laboratory and in the field. Further work was done on cold weather and Arctic footwear, the mountain boot, felt boot and mukluk.

JOHN H. TALBOTT  
Lt. Col., MC  
Commanding